

Analysis of Infinite/Truncated 2D Periodic Structures

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The equivalent parameters of the Floquet's waves are defined for the infinite 2D periodic structure using shunt node equivalent circuit representation of the unit cell. They are then used to develop the formulation for the multiport admittance/ impedance matrix of the finite size array comprised of $N_x \times N_y$ unit cells [1]. It is shown that for uniaxial propagation, the structure comprised of a finite number of columns/rows is identical to multicoupled lines with properly defined parameters. A numerical example is given to demonstrate this identity. Another example utilizing 3×3 unit cell array fed at two adjacent sides is analyzed using the developed formulation and rigorous Sonnet simulation. The comparison of obtained data confirms the validity of the presented approach.

- [1] A. Deleniv, Accepted for presentation on IEEE MTT-S (2005).